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PROGRESS REPORT FOR ASTROPHYSICS DATA PROGRAM CONTRACT NAS5-97066

by S. Terebey, Extrasolar Research Corp.

Progress report for the astronomy research proposal entitled "The Contribution of Ionizing Stars to the Far-Infrared and Radio Emission in the Galaxy"

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PROGRESS FOR 1997 QUARTER 4, Nov 97 - Jan 98

The fourth quarter sees steady progress, with two research papers nearing completion, and research analysis continuing for the next stage of planned research, a quantitative study of the W4 HII region.

A referee's report was received from the Astrophysical Journal. Terebey completed her revisions of the manuscript entitled "The Anatomy of the Perseus Spiral Arm: 12CO and IRAS Imaging Observations of the W3/4/5 Cloud Complex". The paper awaits final touches from coauthor Dr. Mark Heyer (University of Massachusetts).

A referee's report was received from the IEEE Transactions on Image Processing. This quarter the manuscript was revised and sent back to the journal. The manuscript is entitled "Cross Log Entropy Maximization and Its Application to Ringing Suppression in Image Reconstruction," by authors Dr. Yu Cao of Caltech, Dr. Paul Eggermont of University of Delaware, and Dr. Susan Terebey.

Terebey continued analysis work on the next research task, to develop a comprehensive physical picture for the W4 region. W4 is a large HII region whose unusual structure promises to shed light on how massive stars deposit energy and momentum into the interstellar medium. Its ring-like appearance in the infrared (IRAS) and radio continuum (6cm DRAO) images suggest an interpretation where vigorous stellar winds are responsible for evacuating a cavity, pushing the interstellar material outward into a thin exterior shell.

This quarter's activity was to perform a quantitative comparison of the 6cm and IRAS images using IDL to investigate the 2-dimensional (i.e. projected on the sky) structure. Software was developed to measure the 6cm versus IRAS correlation, as well as to display images of the high and low correlation areas.

PROBLEMS FOR 1997 QUARTER 4

There were no significant problems encountered this quarter.

PLANS FOR 1998 QUARTER 1

Next quarter's goals are to make progress in the following areas of the W4 HII region research:

1. Develop simple physical models to test against the data to determine whether the emission forms a spherical shell, or an incomplete shell such as a loop of material.
2. Look for the source of ionization to test whether the Perseus OB cluster is indeed the source of ionizing photons.

REPORT DOCUMENTATION PAGE

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13. ABSTRACT (Maximum 200 words) S. Terebey describes research activities undertaken during the fourth quarterly reporting period. These include the revision of two research manuscripts in response to referee's comments: "The Anatomy of the Perseus Spiral Arm: 12CO and IRAS Imaging Observations of the W3/4/5 Cloud Complex", with coauthor Dr. Mark Heyer of the University of Massachusetts, and also, "Cross Log Entropy Maximization and Its Application to Ringing Suppression in Image Reconstruction," with coauthors Dr. Yu Cao of Caltech and Dr. Eggermont of University of Delaware.				
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